Open Source Parallel Image Analysis and Machine Learning Pipeline, Phase II

Completed Technology Project (2017 - 2020)

Project Introduction

Today, NASA researchers must create, debug, and tune custom workflows for each analysis. Creation and modification of custom workflows is fragile, non-portable and consumes time that could be better spent on advancing scientific discovery. The Phase I open source software Ensemble Learning Models (ELM) provides composable, portable, reproducible, and extensible machine learning pipelines with easy-to-configure parallelization, with tools specifically for satellite data processing, weather and climate data processing, and machine learning and prediction. This is a major advancement over the current state-of-the-art because of reduced workflow creation time, parallelization, portability of deployment and use, extensibility, and robustness. Phase II will extend the Phase I work with more options useful to NASA missions, such as advanced ensemble fitting and prediction tools, feature engineering options for 3-D and 4-D arrays, and a web-based map user interface. Phase II will also harden and extend ELM to make ELM's easy-to-use large data ensemble methods accessible to industry outside of NASA, increasing the potential user base in a variety of domains.

Primary U.S. Work Locations and Key Partners
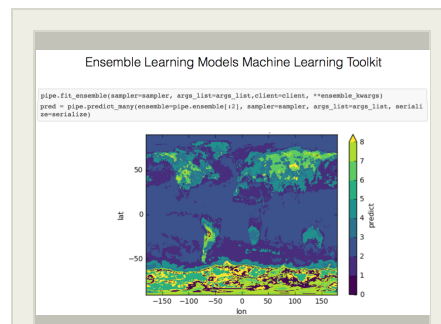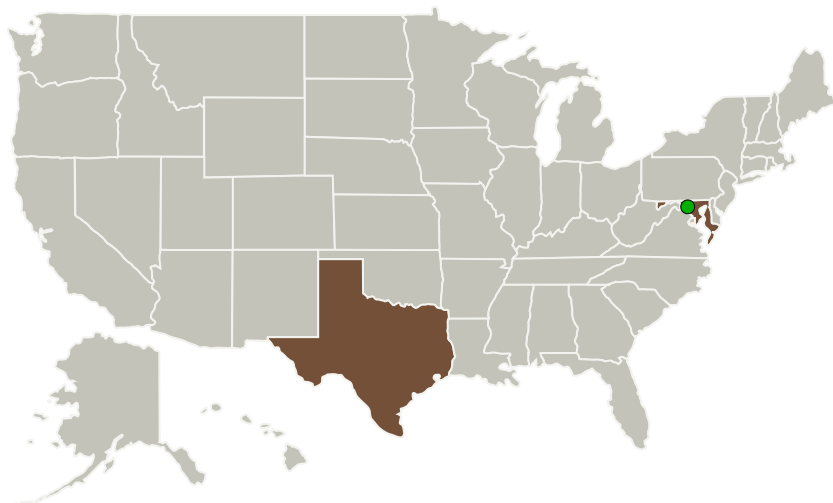
Open Source Parallel Image Analysis and Machine Learning Pipeline, Phase II Briefing Chart Image

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For more information and an accessible alternative, please visit:
https://techport.nasa.gov/view/93685

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Organizations Performing Work	Role	Type	Location
Continuum Analytics, Inc.	Lead Organization	Industry	Austin, Texas
🟢 Goddard Space Flight Center(GSFC)	Supporting Organization	NASA Center	Greenbelt, Maryland

Primary U.S. Work Locations	
Maryland	Texas

Project Transitions

▶ **April 2017:** Project Start

✔ **March 2020:** Closed out

   Closeout Documentation:
   - Final Summary Chart*(https://techport.nasa.gov/file/140830)*
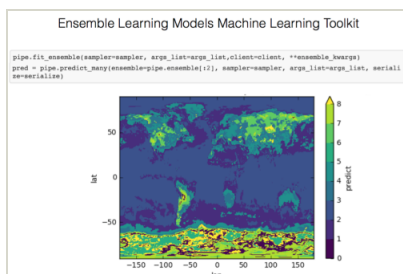
Images

Briefing Chart Image
Open Source Parallel Image Analysis and Machine Learning Pipeline, Phase II Briefing Chart Image
(https://techport.nasa.gov/image/132228)
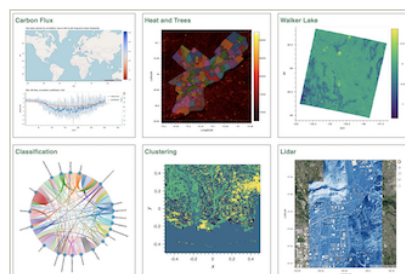
Final Summary Chart Image
Open Source Parallel Image Analysis and Machine Learning Pipeline, Phase II
(https://techport.nasa.gov/image/127289)

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
Continuum Analytics, Inc.

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

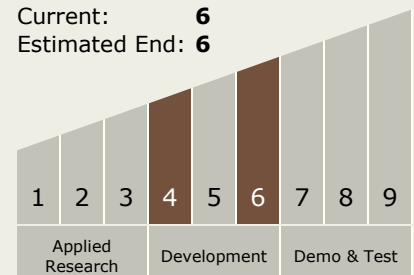**Program Director:**
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
James A Bednar

Technology Maturity (TRL)

Start: **4**
Current: **6**
Estimated End: **6**

1	2	3	4	5	6	7	8	9
Applied Research			Development			Demo & Test		

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Technology Areas

Primary:

- TX11 Software, Modeling, Simulation, and Information Processing
  └ TX11.4 Information Processing
    └ TX11.4.2 Intelligent Data Understanding

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System